THE
MADREPORARIA OF THE SIBOGA EXPEDITION

PART IV

FUNGIA PATELLA

Siboga-Expeditie
XVId

THE MADREPORARIA OF THE SIBOGA EXPEDITION

PART IV

FUNGIA PATELLA

BY

Dr. H. BOSCHMA

With 2 plates

LATE E. J. BRILL
PUBLISHERS AND PRINTERS
LEIDEN — 1923

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INTRODUCTION.

The material collected by the Danish Expedition to the Kei Islands contains a large quantity of the smaller Fungiae belonging to DÖDERLEIN's *patella*-group. Among these a number of well-defined species can be distinguished, most of which are easily to be identified with one of the species dealt with in DÖDERLEIN's monograph on the genus *Fungia* (1902). Representatives of three species, however (viz. *Fungia tenuis*, *patelliformis* and *fragilis*, as these are defined in the following pages), which differ from one another in constant characteristics, are described and figured among the specimens of DÖDERLEIN's *Fungia patella*. After the appearance of DÖDERLEIN's monograph *Fungia patella* has been mentioned by a few other authors, but each of them referred to *Fungia patella* some or more specimens which showed in many cases considerable difference with the group of forms united by DÖDERLEIN under this name. In studying now my material it seemed to me first of all necessary to try and make out how the different forms occurring in the literature as *Fungia patella* had to be classified in groups of specific value and to determine the chief characteristics by which these species may be distinguished.

I desire to thank here Prof. MAX WEBER for the opportunity to publish this revision of *Fungia patella* in the Monographs of the Siboga Expedition and Dr. TH. MORTENSEN for his permission to use a part of the material of the Danish Expedition to the Kei Islands and other specimens from the Copenhagen Zoological Museum for the description and illustration of the different species dealt with in this paper.

Dr. L. F. DE BEAUFORT kindly put the whole of the material of "*Fungia patella*" of the Siboga Expedition and the Amsterdam Museum at my disposal and Prof. E. D. VAN OORT did the same with the material of the Leiden Museum. Mr. C. FORSTER COOPER (Cambridge) sent to me a number of specimens described by Prof. J. STANLEY GARDINER in his papers on Fungid Corals, Prof. G. TORNIER (Berlin Museum) a few of the specimens described by Prof. L. DÖDERLEIN. Mr. A. KNYVETT TOTTON (British Museum Natural History) supplied me with photographs of some of the "Challenger" specimens. I wish to thank here these gentlemen for their readiness in procuring me the material which was of much use to me.

According to DÖDERLEIN (1902) the following species, described by different authors, are to be placed in the synonymy of *Fungia patella*: *Madrepora patella* Ellis and Solander, *Fungia patellaris* Lamarck, *Monomyces patella* Ehrenberg, *Fungia tenuis* Dana, *Fungia (Cycloseris) hexagonalis* Milne-Edwards and Haime and *Diaseris fragilis* Alcock. First of all these forms may be discussed here to determine if they may be identified with any other species of *Fungia*.

The original description and figures of *Madrepora patella* are too incomplete to decide with any certainty if it may be synonymous with any species of *Fungia* described later on. It represents a small circular corallum with somewhat rounded margin and strongly convex lower surface. The only character that gives an indication as to its place among the other Fungiae is the conspicuous manner in which every two septa of the higher cycles unite with one of the next lower cycle. In the larger Fungiae this feature is also found, but only in the smaller species, which form DÖDERLEIN's *patella*-group, it is as distinct as in ELLIS and SOLANDER's fig. 4 (1786). According to the figures the septa of *Madrepora patella* are finely dentated, their sides only slightly granulated. Unfortunately the type specimen is no more present in the Zoological Collection of the University of Glasgow (cp. GRAHAM KERR 1910) and therefore the true nature of this form cannot be determined. It was found according to SOLANDER in the Mediterranean Sea, which is very improbable and also gives no clue to its identification.

ESPER (1797) identifies with *Madrepora patella* a specimen from East India in which also the same arrangement of the septa is found (ESPER's Tab. LXII, fig. 8), but which differs from ELLIS and SOLANDER's specimen by its having a sharp margin, strongly granulated septal sides and conspicuous costal spines. The oral surface of ESPER's specimen bears some likeness with *Fungia tenuis*, but it cannot belong to this species, for its costae possess too large spines.

LAMARCK's *Fungia patellaris* (1816) may be the same as ELLIS and SOLANDER's *Madrepora patella*, but the diagnosis can also refer to another species of this group. Neither give DE BLAINVILLE's (1820) diagnosis and figures of *Fongia patellaris* any indication to which of the species of the *patella*-group this form belongs. LAMOUROUX (1821) gives the same figures as ELLIS and SOLANDER, and his description is also insufficient to determine if the specimen can be identified with one of the later described species. This is in the same way the case with EHRENBERG's *Monomyces patella* (1834).

DÖDERLEIN (1902) proved that the *Fungia patellaris* or *patella* of MILNE-EDWARDS and HAIME (1848, 1851, 1860) and of KLUNZINGER (1879) are to be placed in the synonymy of *Fungia fungites* (L.), whilst *Fungia patella* Verrill (1864) is synonymous with *Fungia plana* Studer [1]). The corals referred by GARDINER (1898) to *Fungia patella* also are specimens of *Fungia fungites* (cp. GARDINER 1909).

DANA's description of *Fungia tenuis* (1846), though not very much worked out in detail, refers in all probability to the same species that was some years after (1851) more fully described by MILNE-EDWARDS and HAIME as *Cycloseris hexagonalis*. In this species every two septa of the higher cycles unite with one of the next lower cycle in a very pronounced manner, as in ELLIS and SOLANDER's *Madrepora patella*, but the corallum of *Cycloseris hexagonalis* is very thin and has a sharp margin, so it hardly can belong to ELLIS and SOLANDER's species. A large quantity of specimens (more than 500) in my material closely agree with EDWARDS and HAIME's description of this species, which must keep the name *Fungia tenuis*, as DANA's description was some years previous to EDWARDS and HAIME's.

VAUGHAN (1907) pointed out that *Diaseris fragilis* has to be separated from *Fungia*

1) According to GARDINER (1909) this species has to be united with *Fungia concinna* Verrill and has to retain this latter name.

patella. The former, now called *Fungia fragilis*, is a well-defined species, which afterwards (1909) was also recorded by GARDINER.

The remainder of the specimens in DÖDERLEIN's *Fungia patella*, after separating from it *F. tenuis* and *fragilis* as distinct species, in all probability constitutes a definite species. The corallum of this species is more or less flat with somewhat elevated central part of the oral surface. The septa are thin with only slight granulations at their sides. In the following pages it will be more fully described, but it may already be stated that it is in every respect quite distinct from *Fungia tenuis* and *fragilis* and also from ELLIS and SOLANDER's *Madrepora patella*. It therefore cannot retain the name *Fungia patella* and I propose for it the new name *Fungia patelliformis* to give yet an indication that most of the specimens of DÖDERLEIN's *Fungia patella* belong to it. DÖDERLEIN already stated that his *Fungia patella* is a comparatively variable species and he himself admits that perhaps more than one species are united under this name, but his material was not sufficient to solve this question.

Among the corals which were sent to me from the Cambridge Zoological Museum there are eight specimens from New Britain, referred by GARDINER (1899a, 1899b) to *Cycloseris hexagonalis* M.-E. & H., viz. the specimens which are reproduced on figs. 15, 16, 17, 18, 19, 20 and 21 of Pl. XX in the above-cited publications and still another from the same locality. It seems to me that none of these specimens belongs to *Cycloseris hexagonalis*. As may be seen in the description of *Fungia tenuis* (of which *Cycloseris hexagonalis* is a synonym) in this paper, the young forms of this species are all alike hexagonal in shape and become free from their anthocaulus long before reaching the size of the specimens figured by GARDINER. In all probability the before-mentioned specimens are young stages of some larger *Fungia*, so much the more as the stalked ones are not unlike those of *Fungia fungites* (L.). In the larger specimens, however (GARDINER's figs. 15 and 16) the surface of the costal spines is granular, which indicates that the specimens probably belong to DÖDERLEIN's *repanda*-group. They are, however, too small to decide with certainty to which of the species of *Fungia* they in reality belong.

In a later paper (1909) GARDINER regards *Cycloseris hexagonalis* as a synonym of *Fungia patella*, and refers to this species three more specimens collected in the Indian Ocean. Two of these I have examined, but none of them can be identified with one of the species dealt with in the systematical account of this paper. As already stated by GARDINER the largest specimen [1]) shows some likeness with VAUGHAN's (1907) figs. 2 and 2*a* on Pl. XXVIII. The septa of GARDINER's specimen, however, are of almost equal height, whilst in VAUGHAN's those of the lower cycles are much more prominent than those of the higher cycles (cp. the description of *F. vaughani* in the following pages.) The middle-sized specimen [1]) probably belongs to the *patella*-group, but it differs from all species of this group known to me. It seems to me that this specimen is closely allied to *Fungia erosa* Döderlein, but it differs from the type-specimen by its having the lower surface much arched, which, however, is a feature of small importance. According to GARDINER *Fungia erosa* has to be absorbed in *F. patella*, but I can

1) cp. GARDINER (1909) page 270.

state here that it cannot be identified with one of the three forms that are incorporated in DÖDERLEIN's species of this name [1]).

BOURNE (1905) places *Cycloseris sinensis* and *C. hexagonalis* in the synonymy of *Cycloseris tenuis*. As for *C. hexagonalis* this is quite correct, but *C. sinensis* M.-E. & H. is a distinct species. I have examined two of the specimens which GARDINER (1905, 1909) referred to *Fungia (Cycloseris) sinensis* and these prove that it is a well-definable species of the *patella*-group.

In his paper on the Hawaiian Corals (1907) VAUGHAN describes a *Fungia* and identifies it with DÖDERLEIN's *F. patella*. A comparison of the tables of measurements as given by DÖDERLEIN and VAUGHAN, however, shows clearly that VAUGHAN's *Fungia patella* is quite a different species from DÖDERLEIN's, the latter being much flatter than the former. Moreover in VAUGHAN's specimens sometimes weak tentacular lobes are found, whilst DÖDERLEIN remarks that these structures never occur in *Fungia patella*. Among my material there are some specimens from the Hawaiian Islands which closely fit in with VAUGHAN's descriptions and figures. It seems to me highly improbable that ELLIS and SOLANDER's description refers to this form, for their figures show a specimen whose septa are of almost equal height. I therefore propose for this form, as it differs from all other Fungiae, the new name *Fungia vaughani*.

The larger part of the specimens identified by VAN DER HORST (1921) with *Fungia patella* indeed consists of representatives of the three species in which DÖDERLEIN's species of this name has to be divided, viz. *Fungia tenuis*, *F. fragilis* and *F. patelliformis*. He has therefore fallen in the same error as former describers by uniting them as *F. patella*.

But for want of sufficient material for comparison he has overlooked, that his material of "*Fungia patella*" contained a few specimens of *F. distorta* Michelin, two specimens of a new *Fungia* (*marginata* n. sp.) to be separated from *F. patella* and three specimens of a new *Stephanophyllia* (*neglecta* n. sp.); besides a young stage of some larger *Fungia* not belonging to the *patella*-group and one specimen of a *Fungia* differing from all the before-mentioned ones.

As I have the good fortune to dispose of a much richer material I am able to describe in the following chapter these different forms and in each case the stations of the Siboga Expedition where the species was found are recorded.

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1) The specimen of the Siboga Expedition identified by VAN DER HORST (1921) with *Fungia erosa* does not belong to the *patella*-group. Its dimensions are 71 × 76 mm., its height 25 mm. Especially the costal spines are too large to classify this specimen among those of the *patella*-group. This specimen is in my opinion a young one of *Fungia klunzingeri* Döderlein, though it has no trace left of its former scar of detachment. But this is also invisible in the specimen of *F. klunzingeri* mentioned by VAN DER HORST on p. 13 and the presence of the scar is therefore not a feature of all specimens of this species.

SYSTEMATICAL ACCOUNT.

The chief object of this paper is to demonstrate that in the *Fungia patella* of different authors a number of distinct species are to be distinguished. Therefore I have described each of these species at some length to try and make an end to this confusion. Some of the descriptions are partially cited from the original diagnoses, but these are usually worked out in some details to show the features in which a certain species differs from the other ones. In each of the species dealt with in this paper only those synonyms are given of which it may be assumed with certainty that they belong to the same species as the specimens I studied. In the case of dubious synonymies it seemed useless to me to enumerate the publications that make mention of the species.

The chief characteristics by which the species of *Fungia* described in this paper may be distinguished from one another are:

1. Septa of the higher cycles more or less suddenly decreasing in height at the spot where they fuse with two septa of a next higher cycle 2
   Septa in whole of their extent of almost equal height. Septa with blunt edges, strongly granulated . . . . . *fragilis.*
2. Septal edges blunt 3
   Septal edges sharp 5
3. Marginal part of the corallum comparatively thick 4
   Marginal part very thin . . . . . *tenuis.*
4. Corallum towards the centre gradually increasing in thickness . . . . . *distorta.*
   Corallum almost flat or concave between margin and centre . . . . . *marginata.*
5. Costae in every part of the lower surface of almost equal prominence . . *patelliformis.*
   Marginal part of the costae strongly developed, towards the centre the costae soon diminish in strength . . . . . *vaughani.*

1. *Fungia tenuis* Dana (Plate IX, figs. 1—7*a*, 12).

Fungia tenuis Dana 1846.
Fungia hexagonalis Milne-Edwards & Haime 1848.
Cycloseris hexagonalis Milne-Edwards & Haime 1851.
Cycloseris hexagonalis Milne-Edwards 1860.
Cycloseris tenuis Moseley 1881.

Fungia patella Döderlein 1902 p.p.
Fungia patella van der Horst 1921 p.p.

Stat. 240. Banda-anchorage. 8 ex.
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

This species is easily to be distinguished from the other ones of this group by its marked thinness and sharp, undulate margin, as it has already been stated by DANA. Especially the last-mentioned characteristic is a very striking one. Moreover the representatives of this species in my material answer in every respect to MILNE-EDWARDS and HAIME's diagnosis of *Fungia (Cycloseris) hexagonalis*, the chief characteristics of which are:

Corallum very thin, under surface a little convex, upper surface more or less flat. Young stages hexagonal, gradually developing into a circular form with somewhat folded margin. Central part of the under surface finely granulated, marginal parts of the costae well-developed, very thin, very little elevated, finely granulated, every second or every fourth costa more prominent than the other ones. Axial fossa small, slightly oblong. Columella rudimentary. As a rule seven cycles, sometimes some members of the eighth; the septa of the higher cycles nearest to the septa of the first cycle appear before those nearest to the other ones. Septa of the lower cycles somewhat more pronounced than those of the next higher cycle; they are low, their edges and sides strongly granulated, thin, the central parts somewhat stronger developed.

The above-mentioned granulations of the lower surface are very small, the central part of this surface is often, especially in the young stages, almost smooth. Only in a comparatively few specimens the costae are visible from centre to periphery. The wall is always imperforate.

MILNE-EDWARDS and HAIME placed *Fungia tenuis* Dana in the synonymy of their *Fungia sinensis*. In this latter species, however, the lower surface is concave whilst in DANA's Pl. 18, fig. 1 it is slightly convex. Especially the undulate form of the corallum, already mentioned by DANA, points to its identity with *F. hexagonalis* M.-E. & H., the only species in which this feature is found.

The specimen which MOSELEY referred to *Cycloseris tenuis* belongs indeed to this species as is proved by the figures (Pl. X, figs. 6, 6*a*).

QUELCH (1886) already remarks that *Cycloseris hexagonalis* M.-E. & H. appears to be identical with *Fungia tenuis* Dana. His opinion, however, that this species represents the *Cycloseris*-form of *Diaseris distorta* is incorrect.

Among the large material collected by the Danish Expedition to the Kei-Islands in the Banda-Islands specimens of every size are found. The different stages of growth are described here in some detail.

In the youngest free-living stages, which are very regularly hexagonal (figs. 1, 7, 7*a*), the scar of detachment is yet visible. The greater diameter of the smallest specimen is 9 mm., its shorter diameter (along the septa of the second cycle) 7.5 mm. There are five complete cycles of septa and a few members of the sixth cycle, the latter only in the neighbourhood of the septa of the first cycle. This irregularity in the appearance of the septa, already mentioned by MILNE-EDWARDS and HAIME, manifests itself also in the development of the septa of the higher cycles. The costae are inconspicuous, with minute spines.

Specimens measuring 20 mm. in greater diameter still possess the regular hexagonal form. The sixth cycle of septa is at this stage complete. Soon afterwards the septa of the second cycle attain approximately the same length as those of the first cycle and the outline of the corallum becomes dodecagonal, as is seen in specimens measuring 25 to 35 mm. (fig. 2). In these seven complete cycles of septa have developed. The costae are a little more prominent, generally every fourth being stronger than the other ones. The central part of the lower surface shows no traces of costae, only minute granulations. The scar also has completely vanished.

In some of the largest specimens (diameter 85 mm. and downwards) and eighth cycle of septa is found, but as nearly every larger specimen shows irregularities in the marginal region they do not form a complete cycle. As a rule these larger specimens also have increased perceptibly in thickness (marginal region till 5 mm.).

The lower surface of the young corals of this species is in most cases convex, sometimes quite flat. In specimens of about 40 mm. and upwards the margin is usually slightly undulating, as it has been stated by DANA and MILNE-EDWARDS and HAIME and afterwards by VAN DER HORST. In larger specimens these undulations often grow out like sharp folds. Sometimes the neighbouring parts of the theca in these folds grow together and then an irregular protuberance develops. The marginal parts, distal from this projection, develop further outwards and the fused part then forms a projection at some distance from the margin (fig. 5).

Irregularities are also caused by Balanids and worms which settle in the marginal part of a corallum and there stop the further development. There is a further outgrowth of the parts of the margin on either side of the foreign organism and after some time the margin of the corallum presents a fissure, at the inmost end of which the Balanid or worm is to be found (figs. 6, 6*a*). In this way a great deal of the corals of this species, which possess an incision in the marginal region, have got this peculiar form. These corals bear a strong resemblance to the specimen figured by DÖDERLEIN (1902) on Taf. I, fig. *k*. This author regards it as a *Cycloseris*-form that passes into a *Diaseris*-form by the formation of a fissure that is about to proceed further towards the centre of the corallum. It seems to me more probable that also in DÖDERLEIN's specimen the fissure developed after the marginal growth had ceased in one place and the neighbouring parts were still growing.

Nearly all specimens collected by the Siboga Expedition closely fit in with the specimens of the Danish Expedition to the Kei-Islands. In some respects the specimen from Stat. 315 differs from the other ones. The lower surface of this specimen shows finely striate costae, visible from centre to margin and has a distinct scar, though its larger diameter is 53 mm. The finer structure of its septa is less regular than in other specimens.

In the smallest specimen of Stat. 240 (fig. 12) four buds have developed, two of which have fused. Among the material of the Danish Expedition to the Kei-Islands there are many specimens of *Fungia tenuis* with similar buds. A detailed description of this kind of budding will be published in a following paper; here only may be stated that in my opinion these young corals have not developed from planulae that fixed themselves on this specimen, but they are originated from parts of the living tissue of its upper surface.

2. *Fungia patelliformis* nov. sp. (Plate IX, figs. 9, 11, 13—16*a*).

Fungia patella Döderlein 1902 p.p.
Fungia patella van der Horst 1921 p.p.

Diaseris-specimens:

Stat. 33. Bay of Pidjot, Lombok. 3 ex.
Stat. 43. Anchorage off Pulu Sarassa, Postillon-islands. 15 fragments (from at least 6 specimens).
Stat. 104. Sulu harbour, Sulu-island. 3 ex.
Stat. 164. Lat. 1°42′.5 S., Long. 130°47′.5 E. 2 ex.
Stat. 209. Anchorage off the South-point of Kabaëna-island. 1 ex.
Stat. 240. Banda-anchorage. 4 ex. [1]).
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 1 ex.

Cycloseris-specimens:

Stat. 43. Anchorage off Pulu Sarassa, Postillon-islands. 3 ex.
Stat. 99. Anchorage off North-Ubian. 3 ex.
Stat. 104. Sulu-harbour, Sulu-island. 1 ex.
Stat. 144. Anchorage North of Salomakiëe-(Damar-)island. 1 ex.
Stat. 153. Lat. 0°3′.8 N., Long. 130°24′.3 E. 1 ex.
Stat. 311. Sapeh-bay, East Coast of Sumbawa. 1 ex.

Corallum circular or slightly oblong. Wall imperforate. Lower surface in young specimens flat, in larger ones usually more or less concave. Marginal parts extremely thin, only in specimens larger than 50 mm. the margin is somewhat thicker. Upon the whole the septa are very thin with only microscopic granulations at their sides. Their edge is sharp and shows minute dentations. The central part of the septa of the lower cycles is much higher than their marginal part; especially in larger specimens there is a considerable difference in height between these two regions. In larger specimens the septa of the first and second cycles have often considerably thickened, as a rule in those of the first cycle the increase is more conspicuous than in those of the second cycle. The central parts of the septa of the fourth and higher cycles have fused with a septum of the next lower cycle. The parts of the septa between this fusion and the centre of the corallum are strongly granulated and much less elevated than the neighbouring septa. The costae are very regularly radiating from the centre, where in nearly all specimens a distinct scar is visible. They are provided with minute spines. The columella is formed by small papillae which in large specimens become more or less trabecular.

A conspicuous characteristic of this species is the peculiar increase of height of the central part of the septa of the lower cycles (fig. 14*b*). The fact that in larger specimens of *Fungia patelliformis* the lower surface is concave constitutes a marked contrast with *F. tenuis* in which the lower surface is convex or flat. The chief difference, however, in these two species is found in the septal edges, which are sharp in *F. patelliformis* and more rounded in *F. tenuis*.

A large part of the specimens of Döderlein's *Fungia patella* belong to this species. I have examined a number of specimens from Ralum, Neu Pommern, among which the specimen represented in Döderlein's Taf. I, Fig. *i* and *i'* and some *Diaseris*-specimens. All of these correspond in every detail with my material of *F. patelliformis*.

1) In the case of two of these, together with three specimens of *F. distorta* the locality is given: "Banda Rif". On the label afterwards has been added: "231. *Fungia patella* Ellis et Solander".

Measurements of some of the *Cycloseris*-specimens:

LOCALITY	GREATER DIAMETER mm.	LESSER DIAMETER mm.	HEIGHT mm.
Siboga Exp. Stat. 99 . .	15	14	4
„ „ Stat. 104 . .	17	17	4
„ „ Stat. 99 . .	23	21.5	5
„ „ Stat. 43 . .	marginal part broken in long axis	27.5	7
„ „ Stat. 153 . .		35.5	5
„ „ Stat. 43 . .	41	38.5	12
„ „ Stat. 311 . .	50	51	12.5
„ „ Stat. 43 . .	53	51	17
Danish Exp. Banda	65	64	13

The specimen of Stat. 153 is strongly worn-off. The specimen of Stat. 311 is extremely thin, one of Stat. 43, though having about the same dimensions (cp. table of measurements) is much thicker.

Fungia patelliformis is found in both *Cycloseris*- and *Diaseris*-forms, but between these all possible transitions may occur. In many cases broken fragments are regenerating into more or less circular coralla, whilst on the other hand many specimens consist of a number of wedge-shaped incompletely fused fragments as in true *Diaseris*-forms (fig. 9). The fracture of a corallum of *F. patelliformis* therefore not always causes the formation of *Diaseris*-specimens; probably also other causes influence the further development of the broken parts.

A very interèsting specimen (from the Copenhagen Museum) which proves that a broken part may regenerate to a completely circular form is represented in figs. 13 and 13*a*. At the upper surface of this specimen hardly any irregularity is to be seen, whilst in the centre of the under surface the small fragment from which the whole of the corallum has grown out is easily to be recognized. Towards the margin the new-formed parts radiate in a very regular manner from the original fragment. Some grooves separating the different regenerating sectors are still visible.

In the material from Stat. 33 of the Siboga Expedition there are some specimens in which also the regeneration has resulted in a more circular form than usually in *Diaseris*-specimens. In one of these (figs. 15, 15*a*) the new formed parts are but partially arranged in the true *Diaseris* manner as wedge-shaped fragments round the former axial fossa. In some parts the direction of the septa is at about right angles to those of the original fragment, a kind of regeneration which is also found in the larger Fungiae.

In some cases the regeneration of a broken corallum of this species takes place in the same manner as in the larger Fungiae, without any traces of wedge-shaped outgrowths. In one specimen illustrating this fact (figs. 16, 16*a*) about one third of the old corallum (the scar of detachment still being partly visible) has completed itself into a somewhat irregular *Cycloseris*-form. All the septa of the regenerated part are more or less radially arranged around the axial fossa. This arrangement is somewhat irregular, as in some parts the direction of the new septa

differs about 45 degrees from that of the septa of the original portion. The result of the regeneration is here not a *Diaseris*-form, but a typical, though a somewhat irregular, *Cycloseris*-form without any grooves between the regenerating components.

3. *Fungia fragilis* (Alcock). (Plate X, figs. 17—23).

Cycloseris freycineti Quelch 1886.
Cycloseris discus Quelch 1886.
Diaseris fragilis Alcock 1893.
Fungia patella var. *filigrana* Döderlein 1902.
Fungia fragilis Vaughan 1907.
Fungia patella van der Horst 1921 p.p.

Diaseris-specimens:

Stat. 33. Bay of Pidjot, Lombok. 1 ex.
Stat. 43. Anchorage off Pulu Sarassa, Postillon-islands. 2 ex.
Stat. 47. Bay of Bima. 1 ex.
Stat. 240. Banda-anchorage. 2 ex.
Stat. 285. Anchorage South coast of Timor. 1 ex.

Cycloseris-specimens:

Stat. 64. Kambaragi-bay, Tanah Djampeah. 3 ex.
Stat. 96. South east side of Pearl-bank, Sulu-archipelago. 2 ex.
Stat. 99. Anchorage off North-Ubian. 20 ex.
Stat. 313. Anchorage East of Dangar Besar, Saleh-bay. 1 ex.
Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 2 ex.

The *Diaseris*-specimens of this species answer to the following characteristics:

Upper surface of the corallum very slightly arched, lower surface flat or slightly concave. Wall imperforate. Marginal parts thin. Costae very fine and low, about equal in size, with minute granulations, often visible from centre to periphery. In the central part of the corallum the costae may be dissolved into separate granules, which are arranged in straight lines radiating from the centre. Therefore the lower surface always has a finely striate appearance. Septa of the lower cycles very little extending above those of the higher cycles, in many specimens all septa of nearly equal height. The part of a septum between the spot where two septa of the next higher cycle have united with it and the centre of the corallum has about the same height as the peripheric part of this septum. In the central part of the corallum therefore also very little difference in height of the septa is observable. Tentacular lobes never found. The septa possess blunt edges, which are beset with numerous, somewhat irregular, often two-pointed dentations. The lateral parts of the septa are densely granulated and hence appear very thick. The neighbouring septa leave extremely little distance between them. The columella is composed of regular papillae.

In the material of the Siboga Expedition there are, besides some *Diaseris*-specimens, a number of *Cycloseris*-specimens in which the septa and the costae have the same structure as in the above-described *Diaseris*-specimens. Especially the fact that the central part of those septa, with which two of a next higher cycle have fused, has approximately the same height as its marginal part, is a marked characteristic and gives a very next appearance to the corallum.

The lower surface of these specimens is flat or slightly concave, their upper surface is convex or flat. There are specimens in which the upper surface is considerably arched, other ones are only slightly convex. In the latter specimens the septa very little vary in height, whilst in the strongly convex specimens the septa of the lower cycles more or less rise above the other ones. In some of the larger specimens the lower surface is overgrown with foreign organisms; where this is not the case the granulations of the costae are visible from the periphery to the centre of the corallum, where often the scar of detachment is still visible. The length of the axial fossa is about 2 or 3 times its breadth, its depth varies according to the height of the specimen. The columella is composed of a large number of small erect papillae.

Measurements of some of the *Cycloseris*-specimens:

LOCALITY	GREATER DIAMETER mm.	LESSER DIAMETER mm.	HEIGHT mm.
Stat. 47	7.5	7	2
Stat. 99	7.5	7	2
Stat. 313	11.5	11	3
Stat. 99	12.5	12.5	3
Stat. 96	13.5	14.5	3
Stat. 99	15.5	14.5	3
Stat. 64	17	17	6
Stat. 96	17	18	4
Stat. 99	19	18.5	6
Stat. 99	marginal part damaged in long axis	28	6.5
Stat. 315	61	60	9
Stat. 315	67	67	9

Without any doubt the *Diaseris*-specimens of the cited localities are to be identified with *Diaseris fragilis* Alcock, that was reestablished as a distinct species of *Fungia* by VAUGHAN. This author's description and figures also show the difference with other species of this group. The specimens described by DÖDERLEIN as *Fungia patella* var. *filigrana* have costae of equal prominence and septa which are in every part of equal height and strongly granulated. These specimens therefore leave no doubt as to their identity with this species.

The structure of the columella is one of the chief characteristics separating the *Cycloseris*-form of *Fungia fragilis* from *Cycloseris mycoides* Alcock, which has a loosely reticulate columella.

The diagnosis of *Cycloseris freycineti* (cp. QUELCH 1886) corresponds almost in every detail with that of *Cycloseris discus* Quelch. They only differ in the following characteristics:

Cycloseris freycineti: Corallum rather thin, convex above and concave below or nearly flat. Septa vertically perforated and trellised.

Cycloseris discus: Corallum thick, flat below and nearly flat above. Septa of the first four or five cycles not fenestrated; those of the last two cycles vertically fenestrated.

Now these differences are of small importance: in thicker specimens also the septa of the lower cycles increase in thickness and their perforations disappear. The specimens of both

of the above-mentioned forms are in my opinion to be identified with *Fungia fragilis* on account of the following features: The septa all reach to about the same height; the central part of the septa of the higher cycles with which two septa of the next higher cycle have fused has the same height as their marginal part; the septa are thickly granulated; the columella is papillose.

I have got photographs from the specimens in the British Museum which indicate that among the material of the Siboga Expedition there are representatives of both forms distinguished by QUELCH. The specimen represented in figs. 20 and 20*a* closely resembles *Cycloseris discus*, that of figs. 19 and 19*a* answers to *C. freycineti*.

The description of *Diaseris freycineti* Milne-Edwards and Haime (1851) is rather incomplete and therefore I cannot decide if QUELCH was correct in regarding two of his specimens as the *Cycloseris*-form of this species. The name *Fungia discus* was already given by DANA (1846) to a larger species and for this reason the name cannot be retained for this species.

Among the material from Stat. 99 of the Siboga Expedition there are five stalked young individuals (anthoblasts, figs. 18, 18*a*). The corallum of these young stages is circular or slightly oblong. The greater diameter of the anthocyathus of the youngest anthoblast is 5.5 mm., its shorter diameter 5 mm. The transition of the stalk to the under surface is very imperceptible: no sharp limit between the two parts is visible. Five complete cycles of septa are present of which those of the lower cycles are slightly more prominent than those of the higher cycles and therefore easily recognizable.

The dimensions of the anthocyathus of the largest stalked specimen are 8×7 mm. In this specimen some members of the sixth cycle of septa have developed. An obvious line of demarcation is visible between the anthocaulus and the anthocyamus.

The smallest free anthocyamus is of about the same size (7.5×7 mm.). Its scar is comparatively large (3.5×3 mm.) and not yet covered with living tissue.

The two specimens from Stat. 43 (figs. 22, 23) resemble one another in every part of their finer structure. One of these is a circular corallum consisting of two parts. The upper surface is slightly arched as in the *Cycloseris*-form of this species. This specimen represents in some respects an intermediate stage between *Cycloseris*- and *Diaseris*-forms.

The specimen from Stat. 33 differs from the other ones by its thicknesss, which is very exceptional in *Diaseris*-forms of this species. Its dimensions are: length 11.5 mm., breadth 11 mm., height 5 mm. It shows some likeness with specimens of *F. distorta*, but differs from these by the fact that its septa are very crowded and almost leave no space between them. The wedge-shaped fragments of which the specimen is composed, are strongly fused.

At first sight the two large specimens from Stat. 315, one of which is represented in fig. 17, show some resemblance with specimens of *Fungia tenuis*. They are, however, to be distinguished from *F. tenuis* by the following characteristics: All septa of approximately the same height; no difference of height between the marginal part and the central part of the septa of the higher cycles; columella papillary. Moreover in all larger specimens of *F. tenuis* in my material the margin of the corallum is undulating, but this feature may be of less importance.

4. *Fungia marginata* nov. spec. (Plate IX, figs. 8, 8*a*, Plate X, figs. 24—26).

Fungia patella van der Horst 1921 p.p.

Stat. 315. Anchorage East of Sailus Besar, Paternoster-islands. 2 ex.

Corallum circular, aboral surface flat or slightly convex, central part of the oral surface slightly arched. Wall imperforate. Marginal part thick, evenly rounded, in larger specimens somewhat curled upwards, the septal edges therefore concave in the region between the centre and the margin. In some specimens the centre and the margin reach to about the same height, but between these two regions the upper surface is hollowed out. Marginal part of the costae strongly developed, forming firm, low lamellae with numerous minute spines. Usually the costae do not reach the centre, although in this feature there is strong individual variation. Every fourth costa is more prominent than the others, some costae of the lower cycles project perceptibly above the other ones. Central part of the aboral surface almost smooth or covered with some granules or irregular parts of costae. The scar is only visible in the very youngest stages. The septa are very regularly arranged, comparatively thick, and minutely granulated, their edge is blunt, with small dentations and numerous granules. Those septa with which two of the next higher cycle have fused in this part diminish considerably in height, sometimes weak tentacular lobes are found. The central parts of these septa are also strongly granulated. The length of the axial fossa is 3 or 4 times its breadth, the columella is either wanting or poorly developed and irregular.

Measurements of some specimens:

LOCALITY	GREATER DIAMETER mm.	LESSER DIAMETER mm.	HEIGHT mm.
Siboga Exp. Stat. 315 . .	13	12	3
Danish Exp. Banda	26.5	26	6
„ „ „	31	31	6.5
„ „ „	42	40	7.5
„ „ „	42	42	9.5
„ „ „	44	44.5	8
Siboga Exp. Stat. 315 . .	48.5	47	12
Danish Exp. Banda	49	47.5	10
„ „ „	53	53	12

The penultimate specimen in this table is the one represented in figs. 24 and 24*a*.

The young stages of *F. marginata* are hexagonal in shape. In the first specimen of the table (figs. 8, 8*a*) the scar is already covered with soft tissue and a little indistinct. Its thickness distinguishes this specimen immediately from the corresponding stage of *F. tenuis*. Somewhat larger specimens are dodecagonal and soon afterwards the corallum becomes circular.

The lower surface of the corallum of this species reminds us in some respects of *Fungia costulata* Ortmann, but in the latter species the costae are more equal in prominence than in *F. marginata*. Moreover the original specimen of *F. costulata* had a not altogether solid wall [1]),

1) cp. Ortmann (1889).

whilst in the above-described species there are no pores at all. Neither is *Fungia marginata* to be identified with the specimens which DÖDERLEIN described as *F. costulata*. These specimens possess a solid wall and their costae are as in ORTMANN's specimen of equal prominence, which distinguishes them from *F. marginata*.

GARDINER (1909) expresses his doubts as to the identity of DÖDERLEIN's specimens of *F. costulata* with the one described by ORTMANN. The aboral surface of the specimen classed by GARDINER with *F. costulata* (1909, Pl. 35, fig. 9) shows some resemblance with specimens of *F. marginata*, but the oral surface of the same specimen (GARDINER 1905, Pl. XCI, fig. 19) is very even convex, whilst in all larger specimens of *F. marginata* the septa have a concavity between the margin and the centre. Moreover I have compared GARDINER's specimen, which was sent to me from Cambridge, with the specimens of *F. marginata* in my material, which proved that it belongs to a quite different species.

The *Cycloseris*-form of *Fungia distorta* described by DÖDERLEIN also shows some superficial resemblance with *F. marginata*, but the former species is regularly convex at the upper surface and its height is larger when compared with its length than this is the case in the latter. Moreover the columella of DÖDERLEIN's specimens is composed of regular papillae (cp. Taf. III, fig. *ee*) as in *Diaseris*-specimens of *F. distorta*.

5. *Fungia distorta* Michelin. (Plate IX, fig. 10).

Fungia distorta Döderlein 1902.
Diaseris distorta Gardiner 1905.
Fungia patella van der Horst 1921 p.p.

Stat. 33. Bay of Pidjot, Lombok. 2 ex.
Stat. 43. Anchorage off Pulu Sarassa, Postillon-islands. 1 ex.
Stat. 240. Banda-anchorage. 3 ex. [1]).

Only a few specimens of *Fungia distorta* were collected by the Siboga Expedition. They bear a close resemblance to the representatives of this species collected by the Danish Expedition to the Kei-Islands, which were found in abundance on the reef of Mua nujanat (near Duroa) and in somewhat deeper water (about 9 M.) in the Banda-Islands. The following description is based on whole of the material I have examined:

Corallum comparatively thick (marginal region in full-grown specimens from 3 to 5 mm.). Under surface flat or slightly concave, upper surface slightly convex. Wall imperforate. Costae provided with minute granulations, their marginal part strongly developed, towards the centre diminishing in strength. Septal edges blunt, beset with numerous small granulations. Septal sides also strongly granular. At the spot where two septa of a higher cycle unite with one of the next lower, the latter suddenly decreases in height. In the centre of the corallum therefore the septa are of different height. The columella, when present, is papillary.

In DÖDERLEIN's figures of this species the costae are visible from the margin till the

1) cp. foot-note on p. 8.

centre. This is also the case in specimens of *F. distorta* sent to me from the Cambridge Museum. In most of the specimens of the Danish Expedition to the Kei-Islands and also in those of the Siboga Expedition the central part of the costae is less distinct. In all other features they answer to DÖDERLEIN's description. I could not consult MICHELIN's diagnosis of this species and have therefore used DÖDERLEIN's description as a base for the determination of my specimens.

6. *Fungia* sp.

Fungia patella van der Horst 1921 p.p.

Locality unknown, 1 ex. (the label indicates the Pacific Ocean as locality). (Amsterdam Museum).

The specimen is slightly oblong with excentric axial fossa, its dimensions are: length 31 mm., breadth 26 mm. and height 7 mm.. The lower surface is convex, especially in the centre, where a distinct scar of 6 × 5 mm. is visible. The costae form low, thin lamellae extending from the scar till the margin. Septa in six cycles, very thin, without dentations, their sides with microscopic granules. Dimensions of the axial fossa 4 × 2 mm. Columella irregular, poorly developed.

This specimen has a strongly worn-off appearance. The absence of septal dentations is probably due to their defect state. The sharpness of the margin and the fact that the synapticula are very clearly visible also indicate that probably the higher parts of the septa have broken off. The specimen represents a young stage of some larger *Fungia*, but it is too young and too much damaged to determine its identity with one of the known species of *Fungia*.

7. *Fungia* sp.

Fungia patella van der Horst 1921 p.p.

Timor. WIENECKE leg. 1 ex. (Leiden Museum).

The corallum is nearly circular, its dimensions are: length 38 mm., breadth 36 mm., height 9 mm.. The under surface is slightly concave, in the centre the scar is still distinct (diameter 5 × 4 mm.). Costae very fine and low, for the greater part visible from the scar till the periphery, with minute spines. Oral surface somewhat arched. Six complete cycles of septa and some members of the seventh cycle. They are, except those of the two last cycles, all of about the same height. The smaller ones suddenly decrease in height where they unite with two of the next higher cycles. The higher part of all septa is strongly granulated, in consequence of this granulation the septa appear much thicker; towards the centre they slightly increase in thickness. The lower part of those septa with which two of the next higher cycles have fused is much thinner than the free peripheric part, but also strongly granulated. The septal edges are blunt, without other dentations than the small above-mentioned granulations.

This specimen shows some resemblance with *Fungia granulosa* Klunzinger, especially the structure of its septa reminds strongly of that in the latter species. It differs, however, from *F. granulosa* by the structure of its lower surface and its solid theca. In a specimen of *F. granulosa* of about the same size (38 × 35 mm.) from the material of the Danish Expedition

to the Kei-Islands only the marginal parts of the costae are visible, the centre being covered by numerous granulations. In this specimen the perforations of the theca are clearly visible.

The specimen of the Leiden Museum perhaps may be a new species, but as only one specimen is available, it seems to me better, at least for the present, not to distinguish it as a distinct species.

8. *Stephanophyllia neglecta* nov. spec. (Plate X, figs. 28—30*a*),

Fungia patella van der Horst 1921 p.p.

Stat. 260. 2.3 miles N., 63° W. from the North point of Nuhu Jaan, Kei-islands. Depth 90 m. 3 ex.

Corallum circular, lower surface flat, upper surface convex. The lower surface is perforated by rows of oblong holes arranged in regular rows along the interspaces between the costae. Costae radiating with great regularity from centre to margin, they are covered with minute spines. Most of these spines are arranged in two rows, next to the series of holes on each side of the costae; the edge of the costae between these rows of spines is slightly grooved. Septa in five cycles, those of the first almost completely free from the other ones, the septa of the higher cycles constitute six triangular systems of fused septa. The septa of the third and higher cycles have a more or less curved course owing to their fusion with other septa. The septa are almost solid, only in those of the higher cycles some perforations are easily to be seen. The septal edge is beset with strong equidistant dentations, which diminish in size towards the axial fossa and towards the margin of the corallum. The septal sides are covered with striae of smaller spines which terminate in the dentations of the septa. Besides these the entire surface of the septa is covered with microscopic granules. The axial fossa is slightly oblong. The columella is composed of fine, highly fused trabeculae.

The diameter of the disk is 10 mm., 9.5 mm. and 7 mm., their height is 3 mm., 3 mm. and 2 mm. respectively.

The smallest specimen (figs. 28, 28*a*) was dead when collected and is somewhat worn-off; this specimen is very regularly built. The larger ones were covered with their soft tissues.

The largest specimen (figs. 29, 29*a*) represents a case of regeneration of a corallum from which one half had broken off. A sharp ridge between the original part and the new formed one is visible at the lower surface. The septal arrangement is owing to the regeneration somewhat irregular. Some of the triangular systems are larger and include more septa than those in the original half, other ones are smaller. Between two of the triangular systems there is not a free septum corresponding with those of the first cycle, for it has fused with one of the compound systems.

The specimen with a diameter of 9.5 mm. (figs. 30, 30*a*) also shows some slight irregularities in the arrangement of its septa and costae, but no distinct traces of a former damage can be found.

The arrangement of the septa of this species is quite the same as in *Stephanophyllia fungulus* Alcock (1902) (cp. also VAN DER HORST 1922). The columella in this species, however, is quite different. Specimens of *S. formosissima* Moseley (1881) are to be distinguished from

the species described here by their far greater delicacy and stronger developed columella. A large number of *S. formosissima* were collected by the Danish Expedition to the Kei-Islands. One of these is represented in Plate X, fig. 31 for comparison with *Stephanophyllia neglecta*.

The above-described species bears a strong resemblance to *S. implexa* Dennant, which has about the same arrangement and structure of the septa. The chief difference between the two species is found in the shape of the columella which is elongate, papillary and not very conspicuous in *S. implexa*.

APPENDIX.

Although there are no representatives of the species described below among the material of the Siboga Expedition, it has to be discussed here, being one of the forms which have been placed in the synonymy of *Fungia patella*.

Fungia vaughani nov. nomen. (Plate X, figs. 27—27*b*).

Fungia patella Vaughan 1907.

The following diagnosis of this species is copied from VAUGHAN's description of *Fungia patella*, some particularities of which, relating to this author's specimens, have been omitted.

Corallum nearly circular, slightly elliptical, somewhat arched above, subplane or excavated in central portion; central scar indistinct or not visible.

The wall is imperforate. Costae very fine and equal in central portion of the base; beyond this area first twelve, then twenty-four, become more prominent than the intervening ones, while there are usually from 12 to 24 that are dominant. The costal margins are entire or microscopically dentate.

The number of septa depends upon the size of the corallum. The first are easily distinguishable by being slightly longer than the second, the second are slightly longer than the third, and the inner ends of the third are more prominent than those of the fourth. At the periphery every fourth septum is approximately equal in prominence, with three decidedly smaller septa between, the penultimate septa being slightly more prominent than the last cycle. The smaller septa are decidedly perforate. The margins of the large septa may be gently or rather suddenly arched in the fossular region. Weak tentacular lobes are sometimes present. The fossa is moderately elongate. The septal dentations are fine, may be submicroscopic, sometimes lacerate. Septal faces minutely and densely granulate; sometimes there are also fine striae. Synapticula rather abundant, not very thick.

Dr. MORTENSEN collected at the Hawaiian Islands five specimens which correspond in every respect to VAUGHAN's detailed description. VAUGHAN's specimens were also found in the Hawaiian Islands and from this locality no other species of this group is recorded. Therefore no doubt is left as to the identity of my specimens with VAUGHAN's *Fungia patella*.

In the following table the measurements in mm. of the specimens among my material are given.

LOCALITY	GREATER DIAMETER	LESSER DIAMETER	HEIGHT
Honolulu, 10—40 fms. . .	50	45	17
	54	50.5	17
Hilo, Hawaii	52	51	18
	56.5	54	18
	62	57.5	20

The comparison of these specimens with the other species dealt with in this paper proves that they belong to a quite different species. The columella of this species, for which I propose the new name *Fungia vaughani*, is papillary. Its septa have a sharp edge. By this characteristic it is to be distinguished from most of the species dealt with in this paper. In *F. patelliformis*, in which also the septa have a sharp edge, the costae are of about equal prominence.

Specimens which were not to be distinguished from those of the Hawaiian Islands were found in the Red Sea (cp. VAUGHAN 1907, 1907*a*, GRAVIER 1911). At present these two widely separated localities are the only ones from which this species is recorded.

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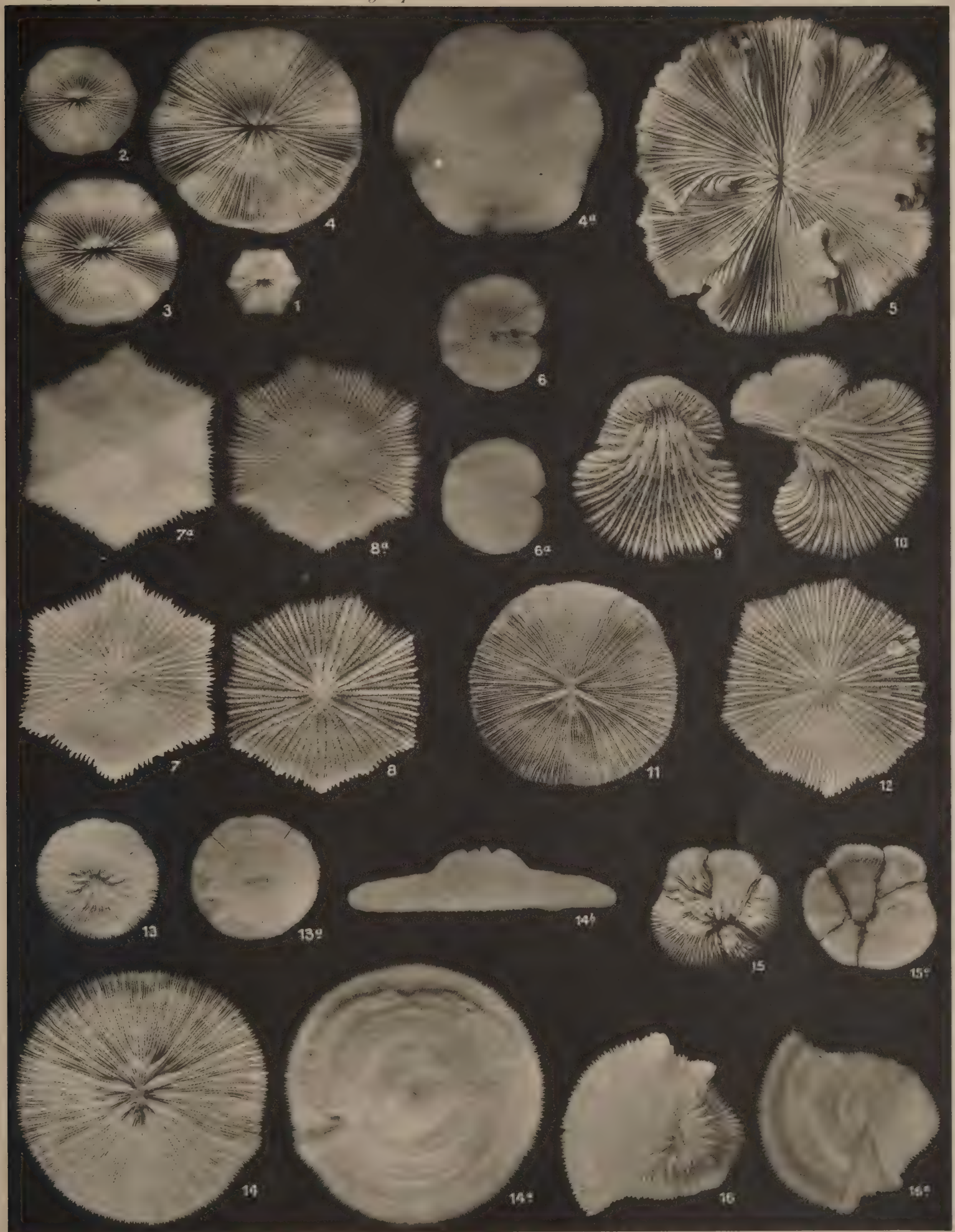
EXPLANATION OF THE PLATES.

All figures are of natural size unless otherwise stated. The specimens from the Siboga Expedition are indicated with S. E., those from the Danish Expedition to the Kei Islands with D. E.

PLATE IX.

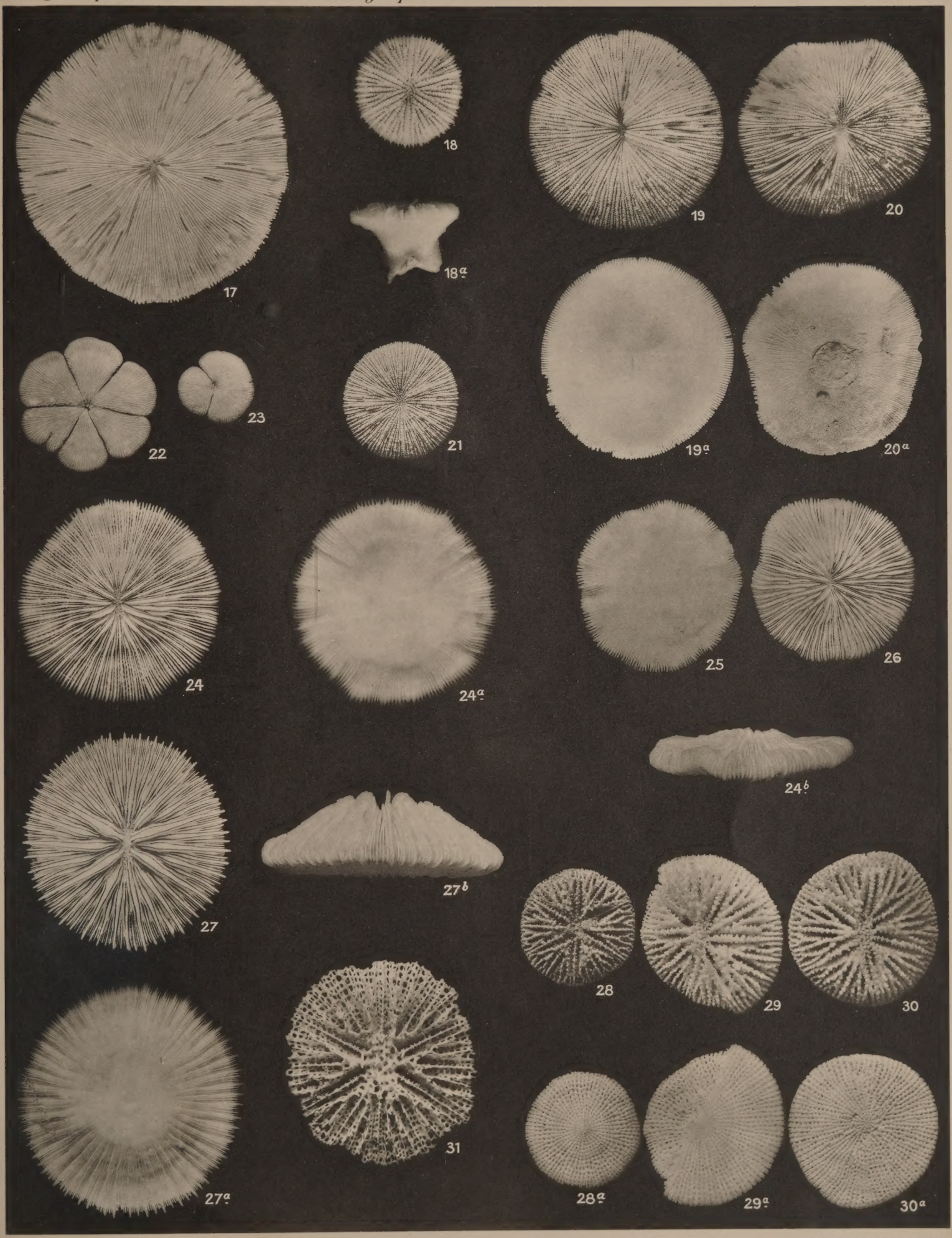
Fig. 1. *Fungia tenuis*. D.E. Banda. Young hexagonal stage.
Fig. 2. *Fungia tenuis*. D. E. Banda. Dodecagonal stage.
Figs. 3 and 4. *Fungia tenuis*. D. E. Banda.
Fig. 4*a*. Lower surface of the specimen of fig. 4.
Fig. 5. *Fungia tenuis*. D. E. Banda. Large specimen with irregularities.
Figs. 6 and 6*a*. *Fungia tenuis*. D. E. Banda. Upper and lower surface of a specimen on which a Balanid has settled.
Figs. 7 and 7*a*. *Fungia tenuis*. D. E. Banda. Upper and lower surface of a very young specimen. × 4.
Figs. 8 and 8*a*. *Fungia marginata*. S. E. Stat. 315. Upper and lower surface of a very young specimen. × 4.
Fig. 9. *Fungia patelliformis*. S. E. Stat. 240. *Diaseris*-specimen. × $2^1/_2$.
Fig. 10. *Fungia distorta*. S. E. Stat. 240. *Diaseris*-specimen. × $2^1/_2$.
Fig. 11. *Fungia patelliformis*. S. E. Stat. 311.
Fig. 12. *Fungia tenuis*. S. E. Stat. 240. Young specimen with buds. × 3.
Figs. 13 and 13*a*. *Fungia patelliformis*. Off Koh Kahdat, Siam. Dr. TH. MORTENSEN leg. Circular specimen, regenerated from a small, irregular fragment.
Figs. 14, 14*a* and 14*b*. *Fungia patelliformis*. D. E. Banda. Upper and lower surface and side view. (The measurements of this specimen are given in the table in the text.)
Figs. 15 and 15*a*. *Fungia patelliformis*. S. E. Stat. 33. *Diaseris*-specimen regenerated into an almost circular corallum.
Figs. 16 and 16*a*. *Fungia patelliformis*. D. E. Stat. 19. Regeneration of a broken *Cycloseris*-specimen without any traces of fissures between the regenerated parts.



HELIOTYPIE VAN LEER AMSTERDAM

PLATE X.

Fig. 17. *Fungia fragilis.* S. E. Stat. 315.
Figs. 18 and 18*a*. *Fungia fragilis.* S. E. Stat. 99. Upper surface and side view of anthoblast. × 5.
Figs. 19 and 19*a*. *Fungia fragilis.* S. E. Stat. 99. Upper and lower surface of a very regular specimen. × $2^1/_2$.
Figs. 20 and 20*a*. *Fungia fragilis.* S. E. Stat. 96. Upper and lower surface of a somewhat less regular specimen. × $2^1/_2$.
Fig. 21. *Fungia fragilis.* S. E. Stat. 313. × $2^1/_2$.
Fig. 22. *Fungia fragilis.* S. E. Stat. 43. *Diaseris*-specimen, composed of six wedge-shaped fragments.
Fig. 23. *Fungia fragilis.* S. E. Stat. 43. Specimen representing an intermediate stage between the *Cycloseris*- and *Diaseris*-forms.
Figs. 24, 24*a* and 24*b*. *Fungia marginata.* D. E. Banda. Upper and lower surface and side view.
Figs. 25 and 26. *Fungia marginata.* D. E. Banda. Lower surface of one specimen and upper surface of another.
Figs. 27, 27*a* and 27*b*. *Fungia vaughani.* Dr. TH. MORTENSEN's Pacific Expedition 1914—16. Hilo, Hawaii. Upper and lower surface and side view of the penultimate specimen of the table of measurements in the text.
Figs. 28—30*a*. *Stephanophyllia neglecta.* S. E. Stat. 260. Upper and lower surface of the three specimens. × 4.
Fig. 31. *Stephanophyllia formosissima.* D. E. Stat. 63. × 4.



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